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and hence the youth of one sex plunge into vice early and openly, more perhaps, from rage against their persecutors, than from natural inclination; and those of the other fly into the arms of the first man who offers to be their deliverer, form unequal matches, or become victims of a far more deplorable misfortune.

They may be, however, and there often is, a defect in the conduct of parents of a nature the very opposite, namely, that of loving their children too much, or more properly speaking, to their ruin. Dreadful are the consequences of that blind affection which will see no fault in a child, and suffer all the untoward propensities of his nature to grow up and strengthen, for fear of afflicting him by control: parents, who are invested with a species of sovereign authority over their children, should use it with tender reluctance on all occasions, but when necessary with inflexible justice, nothing should stand between them and the most sacred duty; but if from the beginning, education has been rightly instituted, there will seldom if ever be occasion for the exercise of this unwelcome privilege. The heart under proper regulation, will beat in sympathy with the warm wishes and expectations of parental love, and reward it by a life of virtue and benevolence.

### SIMPLE SCIENCE.

#### ON AIR, WATER, AND EARTH.

WHAT properties is *oxygen gas* remarkable for? It is essential to animal life; and is likewise so favourable to combustion, that wire will burn away in oxygen gas, as dry wood does in common air.

What are the properties of *nitrogen gas*, (otherwise called azotic gas)? It is destructive of animal life; and the process of burning could not go on in it. It would be extinguished.

What is *hydrogen gas* remarkable for? For its inflammability. It is called inflammable air.

Of what is atmospheric, or common air, a compound—and what are the proportions of its component parts? Of oxygen gas, and nitrogen or azotic gas; in the proportion of 22 parts of oxygen gas, and 78 azotic.

Perhaps it would be more correct to consider atmospheric air, as but *one* gas; consisting (of course) of caloric, helping in solution oxygen, and nitrogen.

22  
78

100

What has oxygen gas been called? *Vital air*; and in fact it is the basis of vital air. Without it our atmosphere would not be respirable.

Is carbonic acid gas respirable? No; it cannot be breathed. It would soon destroy animal life; and is as unfavorable to combustion. A lighted candle, on being thrown into it, is quenched as quickly as if it had been put into water.

Of what gas are the *gas lights* composed? Of hydrogen gas, which is obtained from coal by distillation.

Of what is water composed—in other words, what is water? Of hydrogen and oxygen, in the proportion of 12 parts in the 100 hydrogen, and 88 part oxygen.

What is the difference between ice and water? None; but the ice contains less caloric than water, or water is fluid ice. Just as lead, whether cold or melted, still is lead.

To bring them to a fluid state, do all bodies require the same quantity of caloric to be added to them, and to become part of their composition? Far from it. Thus lead is solid at the common temperature of the atmosphere, and requires an addition of caloric to melt it—i.e. to render it fluid. On the contrary, quicksilver is, at the common temperature imperfectly fluid, and requires the application of artificial cold—(i.e. the removal of some caloric) to make it solid and malleable like other metals—so ice at the common temperature is fluid, and is called water.

A certain quantity of *oxygen* makes a substance become an *oxide*. Add more oxygen and you produce an

*acid of the ous class*. Add still more oxygen, and you obtain an acid of the *ic* class. Thus, if the quantity of *caloric* which a substance contains be small, the substance will be solid. Add more caloric and you produce a liquid. Add still more caloric, and you procure a gas.

Is there any connection between the presence of caloric and the existence of animal life? It seems intimately connected with, and essential to animal life; and the icy, or at least marble-like coldness which follows the extinction of life is striking.

What is marble or limestone—i.e. what are its component parts? It is carbonate of lime; therefore, in strictness, it may be called a salt, being composed of carbonic acid and lime, (the earth-lime).

How may we more accurately enumerate its constituent parts? By considering its constituent parts as three in number—viz.

1st. *Calcium*, which is the metallic basis of the earth-lime.

2dly. Carbon.

3dly. Oxygen—viz. the oxygen which has made the calcium an oxide, and the oxygen which has made carbon an acid.

How may we describe epsom salts, (or sulphate of magnesia) as to its component parts? As consisting of

1st. Magnesium, the base (supposed metallic) of the earth magnesia.

2dly. Sulphur.

3dly. The oxygen, which, combined with sulphur forms sulphuric acid; and it, combined with magnesium, forms the oxide or earth magnesia.

Of what ingredients is gunpowder composed.

1st. Nitre—i.e. nitrate of potash ... .. 76

2dly. Sulphur, ... .. 9

3dly. Charcoal, ... .. 15

100

We have, in the instance of sapphire, and its variety ruby, seen alumine alone form a gem. In what instance does silex do the same? *Amethyst* may be considered as wholly composed of silex. I do not mean what is called oriental amethyst; and which is only a variety of the sapphire.

What do we mean by an ore? A metal mineralized, by being mixed with other substances, which must be separated from it by smelting.

Is gold found native, or in the state of an ore? Always native; never as an ore; but often *lightly* alloyed with silver, copper, &c.

What is the difference between an oxide and an acid? When a substance is combined with a *small* proportion of oxygen, the compound is called an oxide; when with a large proportion, it is called an acid; from the sour taste in general of such compounds

### ON THE RISE AND FALL OF MERCURY IN THE BAROMETER.

The fact, that the mercurial column generally falls before foul and rainy weather, seems quite at variance with the intimation of our senses, as it is a generally prevalent notion, that the air is heavier when the sky is lowering and is overcharged with clouds and vapours. The contrary, however, is the case; and may serve to show the generally fallacious nature of many common opinions in matters of science and philosophy.

That the rise and fall of the mercury in the barometer is occasioned by some corresponding reduction or accumulation in the atmosphere at the place of observation, will be evident to every one who will take the trouble of thinking on the subject.

We need hardly state that the column of mercury is a representation of a column of atmospheric air of an equal thickness; and as such serves to show the various changes that take place in the great ærial envelope of our earth.

With respect to the effect produced by storms and high winds, it may be observed, that a number of contingent circumstances are to be taken into account. The diurnal